dividends from wood research

Recent publications of the Forest Products Laboratory
January 1 to June 30, 1969

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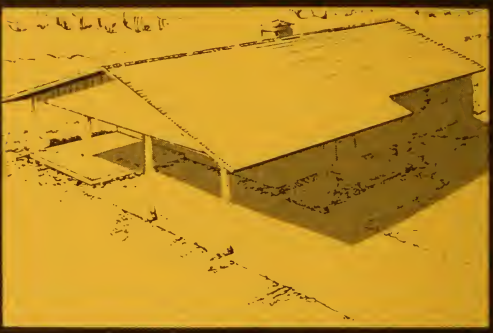


BEDROOM
BATH
BEDROOM
BEDROOM
KITCHEN
DINING
LIVING ROOM

1.

LOW-COST WOOD HOMES FOR RURAL AMERICA: construction manual

by L. O. Anderson
Ag. Handbk. No. 364, 112 pp., May 1969

Building craft workers ranging from highly trained carpenters to neophyte learners will find this a useful guide to good construction for houses of wood.

Liberally illustrated with clear drawings, the book is a carefully defined text based on the best available knowledge on sound construction of well-designed houses at low cost. The result is a judicious blend of practical experience with results of research on wood house construction over the past half century.

The manual was produced in response to urgent requests for a simple handbook showing the basics of good house construction with emphasis on low cost. Concurrently, FPL researchers prepared five sets of plans and specifications for low-cost rural houses, the construction of which is treated in detail in the manual. The design details and techniques illustrated and discussed in the manual are, however, generally applicable to conventional wood house construction. A glossary defines construction terminology from Airway to Weatherstrip.

2.

CLASSROOM DEMONSTRATIONS OF WOOD PROPERTIES

by A. N. Foulger
PA-900. 41 pp., Apr. 1969

Ever wonder about wood--its fibrous structure, how it grows and is nourished by air, sun, and soil, how and why it behaves as it does when put to use? Now, with the aid of this new publication, you can find out for yourself.

In a series of 20 experiments, the pamphlet guides students, from grade school through college, toward a better insight into the properties and behavior of this wonderful substance of trees. A brief introduction tells about the basic structure of wood, which governs its behavior as lumber, veneer, plywood, and even paper. This is followed by an experiment designed to illustrate wood structure.

In succeeding experiments, the student is shown progressively how water moves in plants, characteristic growth and anatomy features and how these affect mechanical and physical properties, species differences, cell structure and properties, and such basic properties as strength, specific gravity, and dimensional changes.

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Reports of slight interest to the layman are designated "Highly technical."

Other recent FPL publications

DRYING

3. Dip treatment in polyethylene glycol not effective in preventing surface checking, by Raymond C. Rietz. USDA Forest Serv. Res. Note FPL-0204, 6 pp., Feb. 1969.

Dipping green red oak boards in a nearly saturated polyethylene glycol solution was not effective in reducing surface checking. In fact, the treatment increased surface-check development as compared with untreated controls. The experiment verified the benefit of presurfacing as a means of reducing surface checking.

FUNGUS AND INSECT CONTROL

4. Control of pulp chip deterioration with kraft green liquor, by E. L. Springer, W. E. Eslyn, L. L. Zoch, and G. J. Hajny. USDA Forest Serv. Res. Pap. FPL 110, 4 pp., May 1969.

A laboratory-prepared kraft green liquor (7.7% Na_2CO_3, 1.9% Na_2S) applied by a dip treatment to fresh red pine and aspen pulp chips prevented loss in wood substance from fungal action and prevented temperature rise in simulators of chip piles.

5. Natural decay resistance of fifteen exotic woods imported for exterior use, by Joe W. Clark. USDA Forest Serv. Res. Pap. FPL 103, 5 pp., Mar. 1969.

The woods, mostly tropical with good service reputations, were appraised for decay resistance, using both laboratory and field tests. Three species proved very resistant, one was resistant, and the remainder were moderately resistant.

6. Subterranean termite studies in southern Ontario, by G. R. Esenther and D. E. Gray. The Canadian Entomologist 100(8): 827-834. Aug. 1968.

The effectiveness of a new method of termite control is described. The method is based on an attractant-insecticide bait. It suppresses the movement of termites through soil. Its effect on a parent colony is obscure.

7. A new method for appraising decay capabilities of micro-organisms from wood chip piles, by W. E. Eslyn. USDA Forest Serv. Res. Pap. FPL 107, 8 pp., May 1969.

Describes a new method for determining decay capabilities of micro-organisms isolated from stored wood chips. Variable moisture contents among test blocks within each individual incubator are provided. This permits development of micro-organisms with diverse water requirements. Utilizing 82 wood chip isolates, this method is compared with the agar-substrate method. (Highly technical)

GROWTH CONDITIONS AND STRUCTURE

8. Effect of tension wood on hard maple used for manufactured parts, by David R. Schumann and M. Y. Pillow. USDA Forest Serv. Res. Pap. FPL 108, 8 pp., May 1969.

Describes effects of tension wood, evidenced by longitudinal warping and shrinking and machining defects, for hard maple lumber.

9. How to predict maximum lumber yields, by David R. Schumann and Henry A. Huber. Furn. Design & Mfgr. 41(5):54,56,58,60,62, May 1969.

Results of six furniture plants' cutting yields are presented. Cuttings were obtained from the four top lumber grades in 4/4 black cherry and soft maple. The actual yields were within 5 percent of the FPL predictions at every plant and in every lumber grade.

10. Through-bark measurement of grain direction; Preliminary results, by A. N. Foulger. Forest Science 15(1):92-94, 1969.

Describes a possible method of estimating spiral grain in the tree stem using sonic probes. Results indicate that the apparatus used, with some modifications, could be valuable in determining the degree of spiral grain in standing trees. Stem damage is minimal.

PERFORMANCE OF WOOD IN FIRE

11. Ammonium polyphosphate liquid fertilizer as fire retardant for wood, by H. W. Eickner, J. M. Stinson, and J. E. Jordan. AWPA Proc. 1969, 12 pp.

Dilute solutions of ammonium polyphosphate liquid fertilizer (TVA furnace-acid type 11-37-0) were pressure impregnated into southern pine lumber. This treated wood (4 to 6 pounds dry chemical per cubic foot) met the Class A interior finish requirements of building codes, and the hygroscopicity, acidity, corrosivity, and strength retention requirements of Military Specification MIL-L-19140c.

PHYSICAL PROPERTIES

12. Acoustical absorption properties of wood-base panel materials, by W. D. Godshall and James H. Davis. USDA Forest Serv. Res. Pap. FPL-104, 8 pp., May 1969.

Sound absorption properties were not affected by variations in moisture contents of wood-base materials at relative humidities between 30 and 80 percent at room temperature. Values of acoustical absorption for 15 typical materials are presented.

13. Factors affecting permeability and pit aspiration in coniferous sapwood, by G. L. Comstock and W. A. Côté, Jr. Wood Science and Technology 2:279-291. 1968.

The influence of drying methods on the permeability of red pine and eastern hemlock sapwood was investigated. Permeability was found to be reduced by normal drying procedures to only a small percentage of the green permeability. Pit aspiration was shown to be responsible for the reduction. (Highly technical)

14. Longitudinal shrinkage in seven species of wood, by R. A. Hann. USDA Forest Serv. Res. Note FPL-0203, 12 pp., Feb. 1969.

Longitudinal shrinkage is recorded for seven species of wood and longitudinal expansion and variability of longitudinal shrinkage within a board are noted. (Highly technical)

15. Method for determining sample size when deriving tolerance limits for a timber species, by B. A. Bendtsen and Fred Rattner. Materials Research and Standards 9(6):30-31, June 1969.

Presents a table, developed by nonparametric procedures, which relates one-sided tolerance limits, sample size, and confidence level. It is a useful tool for a researcher when considering demand for precision of estimate of an important timber strength parameter vs. the cost of a sampling experiment. (Highly technical)

SANDWICH

16. Compressive and shear properties of polyamide honeycomb cores, by Paul M. Jenkinson. USDA Forest Serv. Res. Note FPL-0202, 24 pp., Jan. 1969.

Polyamide honeycomb cores with nominal densities of 1.5 and 3 pounds per cubic foot were evaluated in compression and shear.

SAWING AND MACHINING

17. Sawing to reduce warp of lodgepole pine studs, by Hiram Hallock, USDA Forest Serv. Res. Pap. FPL 102, 32 pp., Mar. 1969.

An evaluation of the relation of sawing methods, log position in tree, eccentricity, position of stud in log, and presence of compression wood to warp in 2- by 4-inch studs of lodgepole pine.

18. Surfacing softwood dimension lumber to produce good surfaces and high-value flakes, by John F. Lutz, B. G. Heebink, H. R. Panzer, F. V. Hefty, and A. F. Mergen. Forest Prod. J. 19(2):45-51, Feb. 1969.

Two experimental cutting methods were evaluated as means of blanking softwood dimension lumber to produce flakes and at the same time develop smooth surfaces on the lumber. Good quality particleboards were made from the flakes produced in the experiment. Wood surfaces were intermediate in smoothness between sawn surfaces and planed surfaces.

WOOD CHEMISTRY

19. Wood wastes for animal feeding, by R. W. Scott, M. A. Millett, and G. J. Hajny. Forest Prod. J. 19(4):14-18, Apr. 1969.

Presents a review of past work on the use of wood residues as an animal feedstuff, both as a non-nutritive roughage and as an energy feed. Discusses the effectiveness of various physical and chemical pretreatments for enhancing the digestibility of wood carbohydrates. Also describes direction of current research.

20. The absence of proton exchange during the conversion of hexose to 5-(hydroxymethyl)-2-furaldehyde, by Milton S. Feather and J. F. Harris. Tetrahedron Letters No. 55, pp. 5807-5810, 1968.

The mechanism of dehydration of hexose sugars was studied by reacting d-glucose and d-fructose in acidified deuterium oxide and examining the product, 5-(hydroxymethyl)-2-furaldehyde, for deuterium incorporation. In both cases, the product contained no carbon-bound deuterium as determined by NMR. (Highly technical)

21. Extractives of jack pine bark: Occurrence of cis- and trans-pinosylvin ether and ferulic acid esters, by John W. Rowe, Carol L. Bower, and E. R. Wagner. Phytochemistry 8:235-41, Jan. 1969.

A new natural product, cis-pinosylvin dimethyl ether, has been isolated. The only other nonpolar benzenoid extractives isolated were trans-pinosylvin dimethyl ether, wax alcohol esters of

ferulic acid, dehydroabietic acid and related diterpenes, and phlobatannin esters. Data are given also on the wax alcohols, free and esterified wax acids, and n-paraffins. (Highly technical)

22. Furfural from spent sodium-base acid sulfite pulping liquor, by L. L. Zoch, J. F. Harris, and E. L. Springer. Tappi 52(3): 486-488, Mar. 1969.

Spent sodium-base acid sulfite pulping liquor from a mixture of hardwoods was evaluated for furfural yields. A maximum yield of 2.04 grams of furfural per 100 grams of spent liquor was obtained with 4.0 grams sulfuric acid and 10 seconds reaction time at 240° C. (Highly technical)

23. New structures from the enzymic dehydrogenation of lignin model p-hydroxy-α-carbinols, by J. C. Pew and W. J. Connors. J. Org. Chem. 34(3): 580-584, Mar. 1969.

The enzymic dehydrogenation of the important lignin model compound guaiacylglycerol β-guaiacyl ether and of simpler models gave the novel dibenzo [d,f] [1,3] dioxepin structure with one side chain being expelled per four units involved. This reaction is very significant in consideration of the structural features of the lignin macromolecule. (Highly technical)

24. New structures from the enzymic dehydrogenation of lignin model p-hydroxy-propiophenones, by J. C. Pew and W. J. Connors. J. Org. Chem. 34(3): 585-589, Mar. 1969

Enzymic dehydrogenation studies of lignin model p-hydroxy-propiophenones have led to new concepts on some structural features of the lignin molecule. Among these are the importance of cyclohexadiene radicals which, in the present work, gave aryl esters of aliphatic acids by side chain transfer and o,p'-biphenyl linkages. (Highly technical)

WOOD FIBER

25. Effect of stock consistence during refining on pulp and paper properties, by Von L. Byrd. Indian Pulp and Paper 23:365-375, Dec. 1968.

Experimental papers made from pulps refined at high consistence had higher tearing resistance, bursting strength, tensile energy absorption, flatwise tensile strength, and sheet shrinkage but they were less stable dimensionally than similar papers made from the same pulps refined at low consistence in the 36-inch double-disk refiner. (Highly technical)

26. Is caustic soda suitable for buffering NSSC digestions? by E. L. Keller, So. Pulp and Paper Manuf. 32(5): 32,34,36. May 10, 1969.

Under conditions falling within the range of commercial practice, buffering with caustic soda or with conventional soda ash gave corrugating boards of similar quality. Large amounts of caustic soda, or restricting the amount of sodium sulfite in cooking, however, caused some loss in strength. (Highly technical)

27. Swelling of prehydrolysis-kraft pulp fibers in cadmium ethylendiamine, by F. A. Simmonds and R. A. Horn. Tappi 52(5):933-938, May 1969.

Swelling techniques showed the differences between hot and cold caustic soda extraction and the critical relation of the concentration of caustic soda in cold extraction to the reactivity of the viscose grade of prehydrolysis-kraft woodpulps. The helical structure in the swollen fiber that persisted through the treatments studied was proven to be the S_3 layer of the cell wall. (Highly technical)

WOOD FINISHING

28. Microscale effects of ultraviolet irradiation and weathering on redwood surfaces and clear coatings, by V. P. Miniutti. J. of Paint Tech. 41(531): 275-84, Apr. 1969.

Reflected-light and fluorescence microscopy demonstrated the need for treatments that will minimize the photodegradation of exterior wood surfaces and indicated changes needed in the properties of commonly used exterior varnishes to obtain greater durability for them on wood surfaces. (Highly technical)

WOOD PRESERVATION

29. Comparison of wood preservatives in Mississippi post study, by J. O. Blew and H. L. Davidson. USDA Forest Serv. Res. Note FPL-01, 10 pp., Mar. 1969.

Contains service life data on southern pine posts installed at Saucier, Miss., in 1949 and 1964 as part of a long-time preservative evaluation.

30. Comparison of wood preservatives in stake tests, by J. O. Blew and H. L. Davidson. USDA Forest Serv. Res. Note FPL-02, 90 pp., Apr. 1969.

Compares wood preservatives used on test stakes of southern pine sapwood.

31. Condition of pine piling submerged 62 years in river water, by T. C. Scheffer, C. G. Duncan, and Thomas Wilkinson. Wood Preserving, pp. 22-24, Jan. 1969.

Dismantling of an old bridge provided an opportunity to observe the condition of pine piling that had been in fresh water more than a half century. Sapwood above mudline had only half its original crushing strength. Bacteria appeared to be the cause of the degradation.

32. Preservative treatments for protecting wood boxes, by A. F. Verrall and T. C. Scheffer. USDA Forest Serv. Res. Pap. FPL 106, 8 pp., Apr. 1969.

Three-minute dipping in the more effective water-repellent-preservative solutions gave wood boxes stored in the open off the ground an average service life of about 10 years in Mississippi and at least 20 years in Wisconsin.

33. Preservative treatments, species characteristics and desired retentions in poles, by Roy H. Baechler. Proc., Wood Pole Institute, June 17-19, 1968, Colorado State Univ., Fort Collins, Colo. pp. 93-99.

The relative commercial importance of the leading pole species and their treating characteristics are reviewed. The need for proper pretreatment seasoning of thin-sapwood species is emphasized. Trends in species used, the choice of preservatives, and retentions based on assay are discussed. More users are requiring a clean final product.

GENERAL

34. Sun-following rack accelerates weathering of wood products, by E. M. Wengert and A. L. Koster. Solar Energy 12:267-272, 1968.

The design and operation of the sun-following exposure rack for finished wood products are described and the climatic effects of this new exposure, based on one summer's use, are discussed.

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